

**APPENDIX B:**  
**ECOLOGICAL FIELD SAMPLING PLAN ANNOTATED OUTLINE**



## **APPENDIX B:**

### **ECOLOGICAL FIELD SAMPLING PLAN ANNOTATED OUTLINE**

#### **B.1 INTRODUCTION**

##### **B.1.1 Background**

This section should provide a brief history of the use, description, and location of the site. Included should be a brief discussion of the contaminated areas of concern at the site.

##### **B.1.2 Objective and Scope of the Field Sampling Plan**

This section should discuss the objectives of the ecological field sampling plan (e.g., to verify or change the conceptual site model; determine the nature and extent of contamination; and determine the presence, absence, or significance of environmental receptors). The purpose of this report should also be discussed (e.g., to provide guidance for all ecological fieldwork to be conducted in association with the remedial investigation/feasibility study [RI/FS] investigation).

##### **B.1.3 Report Organization**

This section should briefly discuss what each chapter of the field sampling plan document addresses.

#### **B.2 SITE SETTING AND BACKGROUND**

##### **B.2.1 Site Background**

This section should discuss the historic and current uses and status of the project site. This could include an associated table that describes each contaminated area of concern at the site, the period of use of these areas, and the activities conducted at each area. Subsections can be written to provide more detail on each distinct contaminated area of concern at the site.

## **B.2.2 Environmental Setting**

### **B.2.2.1 Surface Features**

This section should briefly describe the slope, surface relief, water bodies, wetlands, tree stands, and other surface features of the site.

### **B.2.2.2 Climate**

This section should briefly describe the climate of the area, emphasizing precipitation characteristics.

### **B.2.2.3 Geology and Soils**

The stratigraphy and soils of the site should be briefly discussed.

### **B.2.2.4 Surface Water**

Surface waters and wetlands that occur on or adjacent to the site should be discussed.

### **B.2.2.5 Groundwater**

The major hydrologic units identified beneath the site should be briefly discussed. Emphasis should be placed on the surficial aquifer, and a figure could be included that shows groundwater flow direction and other pertinent information.

### **B.2.2.6 Ecology**

This section should briefly describe the habitat types found on and near the site. An abbreviated listing of the common species of the site area can also be provided. Federally listed species or other unique species or habitats that occur on or near the site should also be mentioned.

## **B.2.3 Previous Investigations**

This section should briefly discuss any investigations that have been conducted at the site. Information to be provided should include justification of why the studies were conducted, site study locations, and conclusions from the results of previous studies. Examples of the categories of studies that may have been conducted at a site that could be

discussed in separate subsections are hydrogeological, surface water, and ecological investigations.

#### **B.2.4 Concurrent Investigations**

This section should summarize other investigations that are being conducted on or near the site. These summaries should include the basic objective(s) of each study and how they may complement the proposed ecological investigation.

### **B.3 ECOLOGICAL CONTAMINANTS OF CONCERN**

This section should briefly describe the contaminants of concern to ecological resources at the site. The basis for the choice of the contaminants should also be summarized. A table summarizing the contaminants of potential concern should be included.

### **B.4 CONTAMINANT TRANSPORT AND FATE ANALYSIS**

The goals (i.e., data quality objectives) of the ecological field sampling plan should be summarized.

#### **B.4.1 Data Gaps**

Data gaps that the sampling plan would address should be discussed.

#### **B.4.2 Conceptual Site Model**

This section should describe the conceptual site model, which links the sources and mechanisms to ecological receptors through various pathways and exposure routes. A figure of the conceptual site model should also be included.

#### **B.4.3 Transport Analysis**

The analysis of contaminant transport and fate describes the extent and magnitude of environmental contamination. It also includes determining the bioavailability of contaminants, the specific media with which the contaminants are associated, the physicochemical characteristics of the medium, and the chemical form of the contaminants.

##### **B.4.3.1 Terrestrial Transport**

This section should briefly discuss contaminant transport mechanisms in the terrestrial ecosystems: (1) transfer of contaminants from surrounding media (primarily soils)

to terrestrial biota (including food chain transfer), (2) effect of contaminants on terrestrial biota (including special concern species), and (3) contaminant residuals in terrestrial biota (including tissues of species consumed by humans).

#### **B.4.3.2 Wetland Transport**

This section should briefly discuss contaminant transport mechanisms in the wetland ecosystems: (1) transfer of contaminants from surrounding media (water and sediments) to wetland biota (including food chain transfer), (2) effect of surface water and sediment contaminants on wetland biota (including special concern species), and (3) contaminant residuals in wetland biota (including tissues of species consumed by humans).

#### **B.4.3.3 Aquatic Transport**

This section should briefly discuss contaminant transport mechanisms in the aquatic ecosystems: (1) transfer of contaminants from surrounding media (water and sediments) to aquatic biota (including food chain transfer), (2) effect of surface water and sediment contaminants on aquatic biota (including special concern species), and (3) contaminant residuals in aquatic biota (including tissues of species consumed by humans).

### **B.5 SAMPLING PROGRAM**

For the most part, the equipment and methods used to collect, handle, store, analyze, and document environmental media are provided in the relevant standard operating procedures and are described in the text or the appendices to the quality assurance project plan (QAPP).

#### **B.5.1 Site Selection**

##### **B.5.1.1 Terrestrial Systems**

This section should describe the areas that would be sampled for terrestrial surveys, biouptake sampling, and in situ toxicity tests. Reference (background) site(s) should be included in this description. A brief discussion of the rationale for selection of these sites should also be included.

##### **B.5.1.2 Wetland Systems**

This section should describe the areas that would be sampled for wetland surveys and for biouptake sampling, and in situ toxicity tests. Reference (background) site(s) should

be included in this description. A brief discussion of the rationale for selection of these sites should also be included.

#### **B.5.1.3 Aquatic Systems**

This section should describe the areas that would be sampled for aquatic surveys, biouptake sampling, and in situ toxicity tests. Reference (background) site(s) should be included in this description. A brief discussion of the rationale for selection of these sites should also be included.

### **B.5.2 Sample Collection and Survey Methods**

#### **B.5.2.1 Terrestrial Sampling**

This section would discuss the purpose and methods for terrestrial sampling. The following subsections are examples for several biotic assemblages. Similar discussions would be required if other assemblages were sampled (e.g., large mammals and reptiles).

**B.5.2.1.1 Vegetation.** The first portion of this section would discuss the purpose for sampling vegetation. Following that would be a description of the quantitative and qualitative sample collection and survey methods that would be used to characterize the vegetation (e.g., transect or quadrat design, sampling periods (seasons), and data to be recorded). Where pertinent, discussions would also be included pertaining to methodologies to be used in collection of samples for residual (contaminant) analyses and for conducting in situ toxicity tests.

**B.5.2.1.2 Small Mammals.** The first portion of this section would discuss the purpose for sampling small mammals. Following that would be a description of the quantitative and qualitative sample collection and survey methods that would be used to capture small mammals (e.g., type of traps, transect or grid design, sampling periods (seasons and trapping days per season), and data to be recorded for collected species). A brief discussion would also be included pertaining to individuals who would be analyzed for contaminant concentrations.

**B.5.2.1.3 Birds.** The first portion of this section would discuss the purpose for sampling birds. Following that would be a description of the methods that would be used to birds (e.g., transect methods, equipment, time of day and length of surveys, and data to be recorded). A brief discussion would also be included pertaining to individuals who would be analyzed for contaminant concentrations.

#### **B.5.2.2 Wetland Sampling**

This section would discuss the purpose and methods for wetland sampling. Subsections similar to those for terrestrial sampling (Section B.5.2.1) would be required (e.g., for wetland vegetation, macroinvertebrates, fish, amphibians and reptiles, birds, and mammals). In addition, discussion should be provided on how wetland delineations would be conducted.

#### **B.5.2.3 Aquatic Sampling**

This section would discuss the purpose and methods for aquatic sampling. Subsections similar to those for terrestrial sampling (Section B.5.2.1) would be required (e.g., for aquatic vegetation, zooplankton, macroinvertebrates, fish, amphibians, and birds).

### **B.6 QUALITY ASSURANCE**

This section should briefly summarize quality assurance and chain-of-custody standards applicable to the ecological field sampling plan. Brief descriptions would be provided for sample identification, taxonomic identification, analytical requirements, quality assurance samples, sample shipment and chain-of-custody, and data administration. (The QAPP should be referenced, as appropriate.)

### **B.7 DATA REPORTING**

This section should describe how the data would be analyzed and reported. Included should be a presentation of formulas and methods that would be used to present population and community descriptors such as relative abundance, density, diversity, species richness, biotic indices, and ecological tolerance and sensitivity indicators; and represent results from residual (contaminant) analyses and in situ toxicity tests. Included should be a discussion of how information from the site would be compared to similar information collected from the reference (background) site(s). This would include various statistical tests (e.g., T-tests, correlations, Mann-Whitney U-tests).

### **B.8 REFERENCES**

This section should list complete citations for all references called out in the text.

**APPENDIX C:**  
**ECOLOGICAL QUALITY ASSURANCE**  
**PROJECT PLAN ANNOTATED OUTLINE**



**APPENDIX C:****ECOLOGICAL QUALITY ASSURANCE  
PROJECT PLAN ANNOTATED OUTLINE****C.1 INTRODUCTION**

Briefly explain that the quality assurance project plan (QAPP) delineates the purpose, policies, standard operating procedures (SOPs), and organization of the quality assurance (QA) program, which is used to establish the integrity of the site project activities. Briefly state what is addressed in the remaining chapters (e.g., one sentence per section).

**C.1.1 Purpose of the Quality Assurance Project Plan**

The overall QA objective is to develop and implement procedures for sample and data collection, sample shipment, and reporting that will allow QA reviewers to determine, with reasonable certainty, whether the abiotic and biotic sampling and the field and laboratory data collected during the remedial investigations at the site meet the criteria and endpoints in the data quality objectives (DQOs). The QA plan covers all environmentally related measurements and includes the measurement of chemical, physical, and biological parameters in the environment to support the site ecological risk assessment.

**C.1.2 Scope of the Quality Assurance Project Plan**

The QAPP establishes responsibilities and authorities for data quality and defines procedures to ensure that field and laboratory activities result in quality data. Inherent in the QA program is the implementation of quality control (QC) measures. These measures ensure that quality-related events have been monitored and that data gathered in support of the project are accurate, precise, representative of the sample matrix, and complete.

**C.2 PROJECT DESCRIPTION****C.2.1 Project Scope**

A brief description should be provided on how the ecological risk assessment (ERA) process is being developed as part of the remedial investigation/feasibility study (RI/FS) activities at the site. A short review of site contaminants should be provided. Also, a brief rationale should be provided as to why the site requires an RI/FS investigation.

### **C.2.2 Project Objective**

Discuss how an ERA for the site will be conducted, using (1) bioassays, (2) whole organism and tissue contaminant analyses (i.e., residue analyses), and (3) community analyses (ecological surveys). A discussion of guidelines developed to ensure that bioassessment techniques chosen for the program are adequate to address the contaminant/environment interactions at the site should also be included.

### **C.2.3 Site Background**

Provide a brief history of the site, including operations that resulted in site contamination. Brief statements on weather, geology, ecology, etc., can also be included in this section.

### **C.2.4 Field Operations**

Field activities to be performed in conjunction with the project should be included in this section. Activities described should include the various physical and biotic characterizations surveys, residue analyses, bioassays, etc., that would be conducted in the field or from field samples. A list of tasks to be performed and any important milestones can be included in a time-line graph format.

## **C.3 PROJECT AND QA/QC ORGANIZATION AND RESPONSIBILITY**

Implementation of the QAPP requires that the project staff maintain an awareness of contractual procedures and goals. It is the contractor's responsibility to develop a QA program to ensure that all information produced by employees and subcontractors is valid and of known quality. QA program requirements cover all activities that generate environmental measurement data.

### **C.3.1 Responsibilities**

This section should describe responsibilities of the project leader and QA manager. The DOE project leader for the site ERA is typically responsible for (1) overseeing and monitoring the performance of all RI/FS participants, (2) interacting with regulatory agencies, (3) being a liaison among DOE and the RI/FS contractors, (4) requiring effective implementation of the QA program, and (5) requiring corrective actions, when necessary.

#### **C.3.1.1 Project Quality Assurance and Quality Control**

The project leader and QA manager are responsible for implementing the QA program. Responsibilities include (1) initiating QA activities; (2) ensuring documentation and

maintenance of all records, logs, SOPs, and analytical results; (3) conducting periodic performance audits; (4) preparing periodic quality reports; and (5) ensuring that corrective actions are taken as necessary.

#### **C.3.1.2 Field Activities**

The QA manager must ensure that all field team members possess appropriate qualifications and training before collection of samples.

#### **C.3.2 Project Organization**

Included should be a figure showing the line of authority and project organization for the ERA as well as a table that provides the names, titles, addresses, and phone numbers of the principal players involved in the ERA and QA programs.

### **C.4 QUALITY ASSURANCE AND DATA QUALITY OBJECTIVES**

#### **C.4.1 Quality Assurance**

The purpose of this section is to define QA goals for accuracy, precision, representativeness, completeness, and comparability.

##### **C.4.1.1 Accuracy**

For samples collected for chemical analysis, accuracy will be checked quantitatively through the use of spikes and blanks controlled by the laboratory certified by the Contract Laboratory Program (CLP). Accuracy of field measurements will be qualitatively controlled through the use of SOPs developed to standardize the collection of measurements and samples. (A definition of accuracy and methods to calculate accuracy should be included in this section.)

##### **C.4.1.2 Precision**

For samples collected for chemical analysis, sampling precision will be checked by replicate analyses performed on each sample matrix. (A definition of precision and methods to calculate precision should be included in this section.)

#### **C.4.1.3 Representativeness**

The definition of representativeness (the degree to which measured results accurately reflect the medium being sampled) and protocols to ensure representativeness should be included in this section.

#### **C.4.1.4 Completeness**

A discussion of completeness (a measure of the amount of information that must be collected to allow a successful achievement of objectives) should be included.

#### **C.4.1.5 Comparability**

Comparability (the confidence with which one data set can be compared with another) should be defined, and methods to control it should be described.

### **C.4.2 Data Quality Objectives**

DQOs are qualitative and quantitative statements that outline the decision-making process and specify the data required to support the ERA. Tables can be included that summarize the DQOs for bioassays, residue and community analyses, biotic and abiotic sampling, and other sampling or analyses conducted to support the ERA. The following is an example of DQOs for seed germination and root elongation bioassays: (1) objective — rapid screening of phytotoxicity of soils; (2) test/target media — soil or sediment; (3) test/target group — plants; (4) test/target species — lettuce, radish, *Spartina*, *Juncus*, or similar species; (5) bioassay endpoint — seed germination (at 5 days) and/or root elongation (at 10 days); (6) bioassay method reference — U.S. Environmental Protection Agency (EPA 1989) "Protocols for Short Term Toxicity Screening of Hazardous Waste Sites," EPA 600/388/029; (7) quality control — control group survival must be  $\geq 90\%$ , all reference assays must fall within control limits, three replicates per test concentration; and (8) data level — EPA Level II. Similar DQOs would be established for all other bioassays conducted for the ERA.

The following is an example of DQOs for fish residue analysis: (1) objective — evaluation of bioaccumulation of contaminants in fish; (2) data use — toxicity and exposure assessments; (3) test/target media — whole organism and tissues; (4) test/target group — fish; (5) test/target species — abundant species from several trophic groups, benthic feeder, and/or game species; (6) measurement endpoint — chemical residue; (7) chemical and environmental data — various contaminants of concern; (8) sampling method — whole body and fillet; (9) analytical methods — e.g., atomic absorption, gas chromatography; (10) typical analytical or statistical detection limit — typically 5 ppb to 5 ppm; (11) quality control samples — duplicates, method blanks, matrix spikes, reference materials of known concentrations; and (12) data level — EPA Level IV. Similar DQOs would be established for all other residue and community analyses.

### **C.4.3 Controlling and Assessing the Quality of Data**

This section should include a brief description of the sampling design to ensure that statistically valid data are collected.

#### **C.4.3.1 Sampling Design**

Appropriate designs may include simple random sampling, stratified random sampling, two-stage sampling, and cluster sampling; and replicate sample collections will be conducted to allow for a statistically designed sampling plan.

#### **C.4.3.2 Blank Contamination Assessment**

A blank contamination assessment (i.e., field blanks, trip blanks, and laboratory blanks) should be performed to determine the impact of contaminant contributions originating from nonpoint sources.

## **C.5 SAMPLING**

### **C.5.1 Sample Labeling**

Each sample will be given a permanently affixed label including sample number, sample date, preservative, analyte(s), sampler's initial, and installation/sample location name.

### **C.5.2 Containers**

All sample containers will be cleaned before use in accordance with EPA protocols. Tables should be included that cover sample preservation, bottle requirements, and holding times for aqueous, solid, physical, and biotic samples.

### **C.5.3 Sample Preservation**

Preservatives will be added to appropriate samples at the time of collection. The required preservatives should be delineated in the tables first called out in Section C.5.2. In addition to preservatives, samples for chemical analysis should be transported in temperature-controlled coolers. Information should be provided that describes the procedural steps for chemical sample preservation.

#### **C.5.4 Sample Collection**

Detailed procedures for the collection of samples are provided in SOPs and references cited later in the various appendices of the QAPP. Therefore, these procedures do not need to be detailed in the QAPP. Collection of all samples will follow EPA and DOE protocols. This section discusses the collection of QC samples and field dissection of biota.

##### **C.5.4.1 Quality Control Samples Collected in the Field**

Quality control samples will include duplicates, rinse blanks/equipment blanks, and trip blanks.

##### **C.5.4.2 Field Dissection of Biological Tissues**

The methods to be used to obtain tissue/organ samples, while preventing sample contamination, should be detailed in this section.

#### **C.5.5 Sample Custody**

Evidence of sample custody needs to be traceable from the time clean sample bottles leave the laboratory to the time that filled sample bottles are brought back to the laboratory for analysis. The following subsections include specific QA plan requirements regarding sample custody labeling and record keeping.

##### **C.5.5.1 Custody Seals**

Custody seals will be signed, dated, and affixed to shipment containers transporting sample bottles from the laboratory. Similar seals also will be required across cooler openings to ensure integrity of samples during shipment from the field to the laboratory.

##### **C.5.5.2 Chain of Custody**

Chain-of-custody forms will accompany sample containers and collected samples during the entire sampling process. A description of where each copy of the form goes should be included.

##### **C.5.5.3 Sample Receipt**

The chain-of-custody process for laboratory receipt of samples should be delineated in this section. This would include logging in samples, checking custody seals and the temperature of sample coolers, assigning lot numbers, and entering information into the computer tracking system.

#### **C.5.5.4 Laboratory Receipt**

The sequence of events once the samples are transmitted to the laboratory should be delineated in this section. These would include sample log-in and storage (including logging of refrigerator/storage temperatures).

#### **C.5.6 Field Equipment Calibration**

Proper calibration and documentation (recording of usage, maintenance, calibration, and repair) of field equipment is required to ensure that field equipment is functioning properly.

##### **C.5.6.1 Frequency of Field Calibration**

Schedules for calibration of various field instrumentation and equipment should be addressed in this section.

##### **C.5.6.2 Calibration Standards**

Appropriate standards that equipment will be calibrated with should be addressed in this section.

### **C.6 SAMPLE ANALYSIS**

#### **C.6.1 Sample Management**

This section should include the name of the supplier (e.g., Contract Laboratory) for the following: clean sample containers, shipping containers, sample preservatives, trip blanks, sample labels, custody seals, and so forth. Sample container cleaning and handling of preservatives should also be addressed in this section.

#### **C.6.2 Sample Holding Times**

A column can be added to the tables called out in Section C.5.2 that provides the allowable holding times for the various samples collected for analyses.

### **C.6.3 Laboratory Analytical Procedures**

#### **C.6.3.1 Methods for Analysis of Abiotic Samples**

Methods to be used to analyze abiotic samples should be detailed. In addition to text descriptions, tables should also be included to summarize methods and quantitation limits for inorganic compounds, volatile organic compounds, semivolatile organic compounds, radionuclides, physical parameters (e.g., water quality analyses and classification of soils), and so forth.

#### **C.6.3.2 Methods for Assessment of Biotic Samples**

This section would have text and tables similar to those in Section C.6.3.1. However, there should also be a discussion of how samples would be initially prepared in the laboratory for analyses.

### **C.6.4 Calibration of Laboratory Instrumentation**

Before sample analysis, chemical calibration for each target analyte must be performed to ensure that analytical instrumentation is functioning within established sensitivity ranges. These would entail daily and initial calibrations, as required.

### **C.6.5 Solution Validation**

All calibration solutions and standards to be used will be prepared and maintained under the normal laboratory standards tracking system. This system must include preparation, checking, documentation, storage, and disposal of standards according to specified procedures and schedules appropriate for each analyte of interest.

### **C.6.6 Reference Materials**

Reference standards are required to calibrate instruments, spike analytical surrogates or standards, and prepare QC samples. This section should include the source of reference materials and storage requirements for them.

### **C.6.7 Data Validation, Reduction, and Reporting**

#### **C.6.7.1 Collection**

This section should describe how data are initially collected, converted to standard reporting units, and recorded in standard formats by the project analysts.

#### **C.6.7.2 Validation**

This section should describe how all generated data will be assessed for accuracy, precision, and completeness. This should include mention of the various QC checks and system audits to be performed during the entire data collection process.

#### **C.6.7.3 Reduction**

This section should describe data reduction methods that would be used and how the reliability and accuracy of the data would be maintained.

#### **C.6.7.4 Reporting**

This section should describe the system(s) within which the validated data (and qualifiers, as appropriate) will be reported.

### **C.7 SYSTEM CONTROLS**

#### **C.7.1 Document Control**

A document control program is established to ensure that all documents issued or generated will be accounted for at the end of the project. A brief description of this program and a listing of the documents projected to be used or prepared during the project should be provided. The latter could include maps and photographs, chain-of-custody records, logbooks, correspondence, reports, etc.

#### **C.7.2 Internal Laboratory Quality Control Samples**

QC samples are prepared and analyzed internally to provide quantitative evidence supporting the performance of the analytical system. In addition to defining QC samples, this section should discuss who will prepare the QC samples, the types of QC samples (i.e., blanks, laboratory control samples and/or spiked blanks, and duplicates), and the frequency of analysis of QC samples (e.g., one per lot of 20 or less samples).

#### **C.7.3 Control Charts**

Control charts are used to monitor the trends and variations in the accuracy and precision of analytical analyses. In addition to defining control charts, this section should list information that would be contained in the charts.

#### **C.7.4 Out-of-Control Conditions**

Out-of-control situations arise from failure to adhere to SOPs, policies, and protocols delineated in the QA program. A listing of out-of-control conditions that could occur during the project should be included (e.g., improper sampling techniques, improper calibration, and improper sample storage). Mention should also be made that corrective actions would be warranted (refer to Section C.11, which addresses corrective actions).

### **C.8 PREVENTIVE MAINTENANCE**

The objectives of the preventive maintenance plan for periodic instrumentation checks should be addressed. A calibration and maintenance schedule for field and laboratory equipment should be provided. Reference can be made to applicable publications and other QA programs that address the calibration and maintenance of equipment.

### **C.9 RECORD KEEPING**

This section involves information on logbooks that would be kept for record-keeping purposes for both field and laboratory activities.

#### **C.9.1 Sampling**

This section should provide a listing of the information that would be required in the logbook for each sample collected in the field for analysis.

#### **C.9.2 Laboratory Records**

##### **C.9.2.1 Laboratory Logging**

This section should list the information to be written into the logbook once samples are received by the laboratory. These would include field sample number, date of receipt, sample condition, analysis required, and so forth.

##### **C.9.2.2 Sample Identification Numbers**

This section should describe how sample identification numbers would be assigned to each aliquot of a sample (e.g., based on the number of samples that can be analyzed within a 24-hour period and the order in which these samples will be analyzed).

### **C.9.2.3 Analytical Records**

**C.9.2.3.1 Reference Materials.** This section should list the information that will be logged in for all reference materials used for analytical purposes.

**C.9.2.3.2 Sample Handling.** This section should list the information that will be logged in specific to daily operations (e.g., samples handled, standards used, QC samples prepared, procedures used, and resultant calculations).

**C.9.2.3.3 Instrument Operation.** This section should list the information that will be included in the logbook for each instrument (e.g., date, operator, description of maintenance, instrument settings, samples analyzed). This section should also list all the information that should be put on hard copy data outputs from instrument printouts.

## **C.10 AUDITS**

This section discusses performance and system audits for evaluating the performance and quality of project field and laboratory operations.

### **C.10.1 Field System Audits**

A field audit should be performed during the first few days of the initiation of field activities by the QA manager (or designee) to determine if the field teams are following protocols delineated in the QAPP. This section should contain a listing of the items that the QA manager will check for performance (e.g., copies of all appropriate plans and forms, required instruments [properly calibrated], logbooks, sample collection procedures, and packaging of samples). This section will also include a brief discussion of what the QA manager's actions would be if deficiencies were encountered and where results of the audit will be maintained.

### **C.10.2 Laboratory System Audits**

This section should list items that would be monitored during laboratory audits (e.g., description of the laboratory, information on instrumentation, adherence to SOPs, staff qualifications and training, storage facilities, logbooks). This section should also discuss the evidentiary audit that would be required for the project. This audit includes a procedural audit, a written SOP audit, and an analytical project file evidence audit. This audit is conducted to determine if laboratory policies and procedures are in place.

### **C.10.3 Performance Audits**

This section should discuss how the EPA would submit a spiked performance evaluation blank sample(s) to the laboratory for analysis and that the results would be used by the EPA to determine the accuracy of the laboratory.

### **C.11 CORRECTIVE ACTION**

This section should describe how and when corrective actions would be initiated (e.g., due to deficiencies encountered during audits or failure to adhere to QAPP requirements). Mention should be made as to at what managerial level corrective actions would be made and what action would be taken if problems could not be resolved. The steps in taking corrective actions should be listed, starting with identification of the problem and ending with verification that the problem has been corrected. A copy of a corrective action report form can be included in this section to show how the corrective action process would be documented.

### **C.12 QUALITY CONTROL REPORTS**

This section should list all the documents and deliverables that would be submitted to DOE in support of the project work conducted at the site (e.g., certification packages, audit reports, QC status reports, logbooks).

### **C.13 REFERENCES**

This section should list complete citations for all references called out in the text.

**APPENDIX D:**  
**SENSITIVE ENVIRONMENTS RATING VALUES**

